

# FIG.1-1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVLLACLERAQAQFGCSNTKINDQARKMFYDAHNDARRSMAKGLE  
 PNKCGLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWGQNYATYM  
 GSIADPLPYASMAVNGWSEIRTVGLTDPDNKYTNSAMFRFANMANGKASAFG  
 CAYALCAGKLSINCIYNKIGYMTNAIIEKGDACSTDACETTSQCKNGLCYK  
 APQAPVVEFTMCPSTVEANARTWAKGCLYQHSTSAQRPLGENLYMISINMP  
 MAKQMPKLVKYSCTEANARTWAKGCLYQHSTSAQRPLGENLYMISINMP  
 KIQTAEDSSKAWSELKDFGVGSDNILTQAVFDRGVGHYTMAWEGTTEIGCF  
 VENCPTFTYSVCQYGPAGNYMNLITYKGSPTADADCPGTQTCSVAEALCVIP

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTTCTAGCATGCCCTGGAGAGACGGTTG  
 CACAGACGTTGGCTGCTTAACACCAAGATCAATGACCAGGCTCGTAAGAT  
 GTTCTATGATGCTCACAAATGATGCAAGACGAAGCATGGCTAAAGGCTTGAG  
 CCAACAAGTGGGACTCTTATCTGTTGGAAGAATGTTTATGAATTGAATT  
 GGGATTCCGAGATGGAAGCAAAGCTCAGGAATGGCAGACGGATGTCCCA  
 GCTCTTTCCAGACATTTGATCCAACATGGGGCAGAACTACGGCAGCTACAT  
 GGGATCGATTGCTGATCCGCTTCCATACGCTTCCATGGCTGTTAATGGGTGGT  
 GGTGGGAAATTAGAACCGTAGGACTTACGGATCCTGATAACAAGTACACTAA

To Fig.1-2





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FIG. 1-2

FROM Fig. 1-1

CAGTGAATGTTCCGATTGCTAATATGGCAAAATGGTAAAGCTTCAGCTTTTG  
GATGTGCATACGGCTTGTCGCAGGAAACTATCCATCAATTGCAATTACAA  
CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAGGAGATGCCGTG  
ACCAGTGACGCTGAATGCACCACCTACTCAGACTCACAATGCAAAAACGGTC  
TTTGCTATAAGGCACCTCAAGCTCCAGTCCGTGAGACTTTTACAAATGTGCCCT  
TCGGTCACGGACCACTCGGATCAGGCGGTCAAACTTCTTGGACACCCATA  
ACAAATTGCGTACAAGCCTTGCCAAGGGACTTGAAGCTGATGGAATTGCCGC  
TGGAGCA'TTTGCACCAATGCCAAGCAATGCCAAAACCTGGTAAAATACAGC  
TGCACAGTTGAAGCAAACGCCAGAACATGGGCAAAAGGATGCCTTTACCAGC  
ATTCAACAAGCGCACAGAGACCAAGGACTCGGTGAAAATCTTTATATGATCAG  
CATTAAACAACATGCCATAAATTCAAACCGCGGAGGACTCCTCAAAGGCTTGG  
TGGTCCGAGTTGAAAGACTTCGGAGTCGGTTCTGACAACATTTCTGACCCAAAG  
CAGTTTTTGATCGTGGCGTTGGACATTACACACAAATGGCATGGGAAGGAAC  
TACTGAAATTGGATGTTTTGTGGAGAAATTGTCCAACATTCACTTATTCGGTAT  
GCCAATATGGTCCAGCGGAAACTACATGAACCAACTAATCTATACCAAGGG  
CTCACCATGCACAGCTGACGCCGATTGCCAGGAACCCAGACATGCAGTGTC  
GCTGAAGCATTATGTGTTATCCCTTAGTAAATTTTCTATGCAACTCITTGAAA  
GTCATAATAAATATGCAAAAATTAATAAAAAA

To Fig. 1-3



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# FIG. 1-3

FROM Fig.1-2

VAP-2 amino acid sequence (SEQ ID NO:3)

MNVLSAVTLFLIFRYAQTVNIEGSGNDELLEQNVWNDVDDKVVEALGLDD  
ELLTEHVCNKSTITQLQEIILTTNELLRRSLAFGKQRNKRGLMNGARNMYKLD  
WDELASLAANWSTSCPQHFMPQSVLGSNAQLFKRFYFYFDGHDSTVHMRNA  
MKYWWQQGEEKGNEDQKNRFYARRNYFGWANMAKGYRVGCCSYIMCGDG  
ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPSKCLVPEGLCQAPSMV  
KDDGGSFQCDNSLVSDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM  
IKMEYDCMLERFAQNWANNVCFAHSAHYERPNNQGNLYMSSFNPDPRLIHT  
AVEKWWQELLEFGTPIDNVLTPELWDLKGKAIGHYTMAWDRTYRLGCGIANC  
PKMSYVVCHYGPAGNRKNNKIYEIGDPCEVDDDCPIGTDCEKTTSLCVISK

*vap-2* cDNA nucleotide sequence (SEQ ID NO:4)

ATGAACGTGGTCCTTCCGCTGTCACTCTTTTCTTATTTTCGATATCGGCAG  
ACTGTGAATATAGAGGCAGTGGAGGAAATGATGAGCTTCTTGAGCAGAACG  
TGTTGAACGATGTAGACGACAAGGTGTAGAACGACTTGGTGGTCTTGATGA  
TGAACCTGCTAACCGAACAATGTGTGTAAACAAATCAACGATCACTCAGCTACAG  
CAGGAGATCATCTTGACAACCCACAATGAATTACGAAGATCATTTGGCTTTCG  
GAAAGCAAGAAACAAGAGAGGCTCTCATGAACGGTGGAGAAATATGTATA  
AACTGGATTGGGATTGTGAACCTGGCATCACTTGCAGCCAAATGGTCAACCTCC  
TGCCCTCAGCACTTTATGCCGCAATCGGTACTTGGCTCCAAAGCTCAGCTTTT

To Fig.1-4



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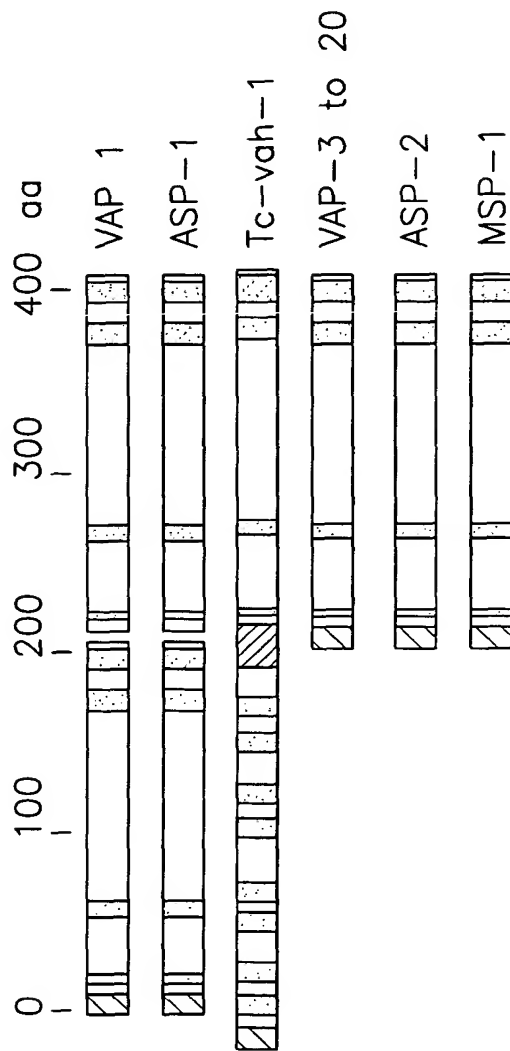
FIG. 1-4

FROM Fig.1-3

TAAGCGTTTCTATTTTATTTTGGATGGCCAGGACTTACTGTACATATGCGAA  
ACCGATGAAGTATTGGTGGCAGCAAGGTGAAGAAAGGCAATGAGGATC  
AGAAAAATAGATTCTATGCCAGACGAAATTATTTGGATGGGCAACATGGC  
AAAGGAAAAACATATCGAGTTGGATGCTCGTATATTATGTGGCGGACGGT  
GAATCTGCACITTTTCACITGTCTTTATACGAAAAAGCCCAATGCGAAAAAG  
AAATGATTTACGAAAAATGGAACCCCTGCTGTGAGGATAAAGACTGTTTCAC  
ATATCCAGGATCAAAATGTTTAGTACCTGAAGGATTATGTCAAGCACCTTCTA  
TGGTAAAGGATGATGGAGGAAGTTTCCAATGTGATAACTCCCTTGTGTCAGA  
TGTCAACCCGCAATTTCACTTTGGAGCAACACAATTTTTATAGATCTCGTCTTG  
CAAAAGGTTTTGAATGGAATGGAGAAACAACACTTCCCAGCCCAAGGCTAG  
TCAAATGATCAAAAATGGAGTATGACTGCATGTTGGAACGGTTTGCACAAAAC  
TGGGCAAAATAATTGCGTTTTTGCACACTCGGCACATTACGAAAGACCCGAATC  
AGGTCAGAAATCTCTACATGAGTTCTTTCTCAAAACCCTGATCCTAGAGCCTT  
ATACATACGCGCGTCGAGAAGTGGTGGCAGGAAATGGAGGAGTCCGTACTC  
CAATTGATAACGTTCTGACACCCGAATTGTGGGATTTGAAAGGGAAGCGAT  
AGGACATTAACACTCAGATGGCCTGGGATCGTACTTACCGTCTTGGTTGTGGAA  
TCGCAAACTGTCCGAAGATGTCGTACGTGGTTTGTCACTATGGGCCAGCAGG  
CAACAGAAAGAACAAATAAAATCTATGAAATCGGGGATCCTTGGGAAGTCGAT  
GATGATTGCCCGATTGGAACAGATTGTGAAAAGACAACTTCTTTATGTGTGAT  
CTCAAAATAA

FIG. 2

Schematic diagram of nematode venom allergen protein domains



hydrophobic signal sequence  
 conserved cysteine(s)



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FIG.3-1

CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

VAP-1N	1	-----MAVLAVVLLACLERA	V	AQ	T	F	G	22
VAP-1C	1	-----PQAPV	V	E	T	F	T	11
VAP-2N	1	MNVLSAVTLFLIFRYAQT	V	N	I	E	G	60
VAP-2C	1	-----S	F	Q	3			
ASP-1N	1	-----MFSPV	I	V	S	V	I	26
ASP-1C	1	-----D	V	P	E	T	N	8
VAP-3	1	-----M	N	Y	L	L	V	13
MSP-1	1	-----M	S	N	K	L	I	14
VAP-1N	23	C	S	N	T	K	I	76
VAP-1C	12	C	P	S	V	T	-	70
VAP-2N	61	C	N	K	S	T	-	114
VAP-2N	4	C	D	N	S	L	V	59
ASP-1N	27	C	S	N	S	G	-	80
ASP-1C	9	C	P	S	N	T	-	64
VAP-3	14	C	S	A	D	F	G	66
MSP-1	15	I	Y	T	V	N	S	71

To Fig.3-2



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FIG.3-2

FROM Fig.3-1

VAP-1N	77 KAQEWADGCPSSQT--FDPT---	WGQNYATYMGSI--ADPLPYASMAVNCWWEI	IRTVG	129
VAP-1C	71 NARTWAKGCLYQHSTSAQRPG---	LGENLYMISINN--MPKIQTAEDSSKAWWEIL	KDFG	125
VAP-2N	115 LAA NWSSTSCPQHFMPSVLGS---	NAQLFKRFYFYFDGHDSTVHMRNAMKYWWQQ	QCEKKG	171
VAP-2C	60 FAQNWANNCVFAHSAHYERPNI---	QGQNL YMSSFSN--PDPRSLHTAIVEKWWQ	EELEFG	114
ASP-1N	81 QLQDAIQSCPSAFAG---IQG---	VAQNVMSWSSGGFPDPSVKEQTL SGWWSG	AKKNG	134
ASP-1C	65 SAI RHGNKCVYQHSHGDRPG---	LGENIYKTSVLK--FDKNKAAKQASQLWW	NELKEFG	119
VAP-3	67 SAQNYANGCPTGHSG---DAG---	LGENLYWYWTSGSLGDLNQYGSAA	SASWEKEFQDYG	120
MSP-1	72 SAQRWANKCIFDHNGTDL YSGGKFY	GENLYLDGDFEH-KNITQLMIDACNAW	WGESTTDG	130

VAP-1N	130 LITD-----PDNK--YTNSA---	MFRFANMANGKASAFGCAYALCAGKL---	SINCI	172
VAP-1C	126 VGSD---NITLTAQ--VFDRG---	VGHYTMQAWEGTTEIGCFVENCPTFT---	YSVCQ	171
VAP-2N	172 NEDQ-----KNR--FYARRN--	YFGWANMAKGT YRVGCSYIMCGDGES---	ALFTCL	217
VAP-2C	115 TPID---NVLTPE---LWDLKGKAI	GHYTMQAWDRTYRLGCGIANCPKMS---	YVUCH	163
ASP-1N	135 VCPD---N-----KYNNGG---	LFAFSNMVYSETTKLGCA YKVC GTKL---	AVSCI	176
ASP-1C	120 VGPS---NVLTTA---LWNRPGMQI	GHYTMQAWDTTYKLGCAYVFCNDFT---	FGVCQ	168
VAP-3	121 WKS---NLMTID--LFNTG---	I GHATQMAWAKSNLIGCGVKDCGRDS	NGLNKVTVCQ	171
MSP-1	131 VPPSWINNF LPTDNKENDEKFEAV	GHWTQMAWAKTYQIGCALKVCHKPD	CNGN--LIDCR	188

To Fig.3-3



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FIG.3-3

FROM Fig.3-2

VAP-1N	173	YNKI	GYMTNA	I	YE	KGDACT	SDAECT	TYST	DS	QCKNGL	CYKA	----	213
VAP-1C	172	YGPAG	NYMNL	I	YT	KGSPCT	ADADCP	TQ	TC	SVAEAL	C-V	----	212
VAP-2N	218	YNEKA	QCEKEM	YE	NGKPCCE	DKDCFT	YPGSKCL	VPEGL	CQAPS	VMVKDD	GG	268	
VAP-2C	164	YGPAG	NRKNNKI	YE	IGDPCE	VDDDCPI	GT	DC	EKTTS	C-V	----	205	
ASP-1N	177	YNGVGY	ITNQPMWE	ITGQACKT	GADDCSTYK	NSGCC	EDGLCT	KGP	----	----	----	218	
ASP-1C	169	YGPAG	NYMGHV	I	YTMGQPCS	QCSPGA	TC	SVTEGL	C-S	----	P	206	
VAP-3	172	YKPQGNF	INQYI	YVSGATCS	GCPSGT	SC	ETSTGL	CV	----	----	----	207	
MSP-1	189	YYPGG	NGMGSPI	YQQGKPAS	GCCKAG	PS	TKYSGL	CKPD	PHQNN	----	----	231	





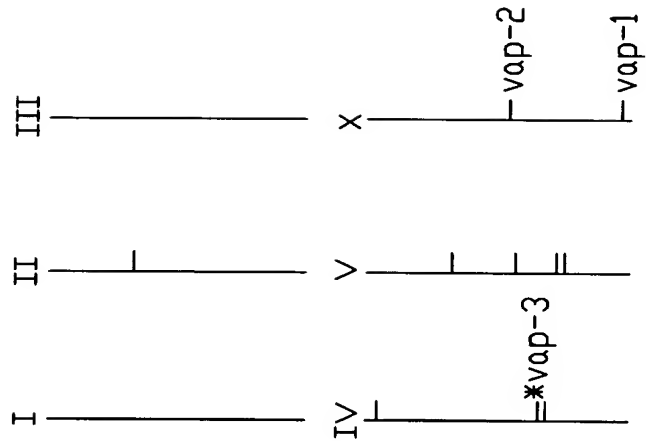
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FIG. 4

Schematic map of selected *C. elegans* vap genes





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FIG.5B

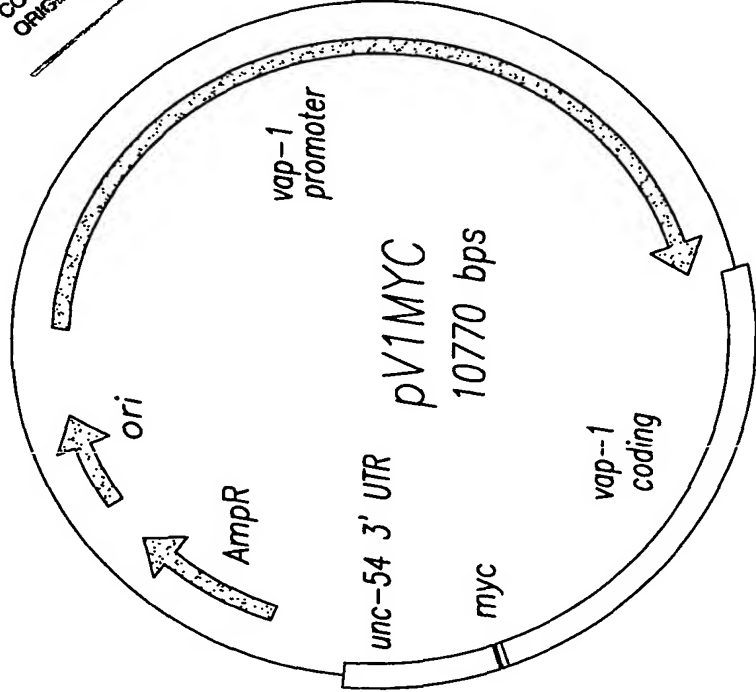
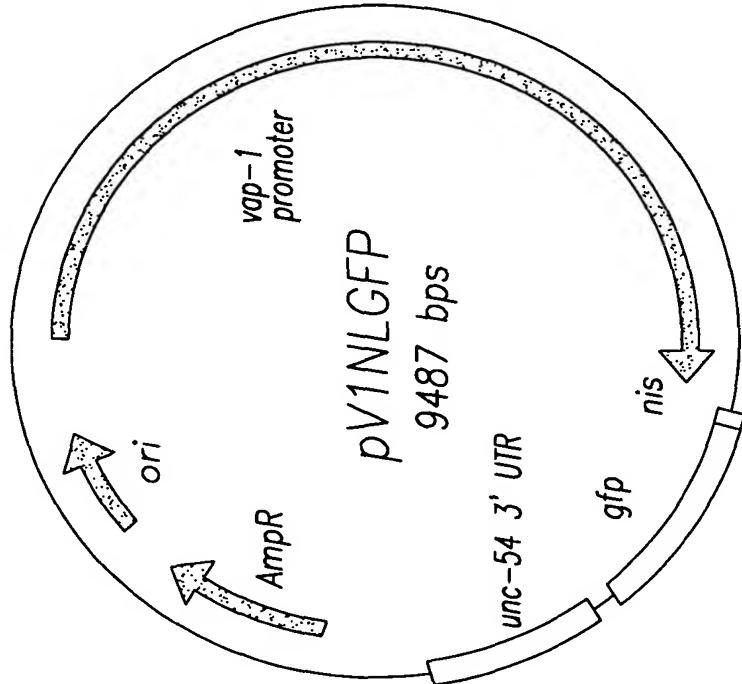


FIG.5A





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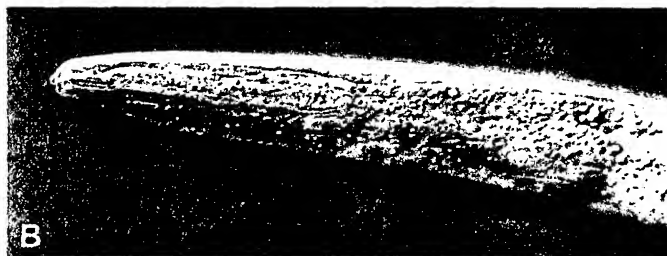
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**FIG. 6A**



**FIG. 6B**



**FIG. 6C**

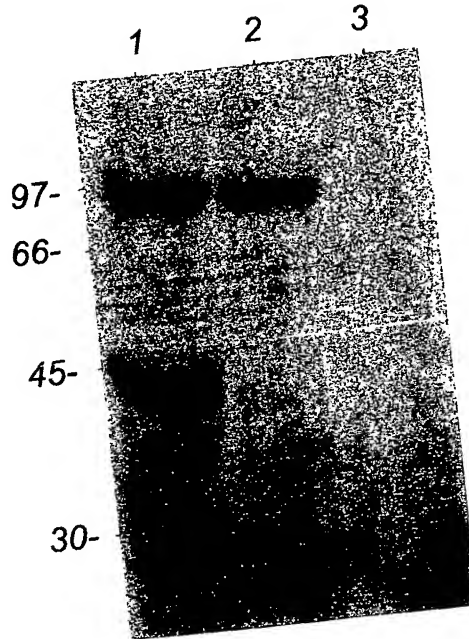




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**FIG. 7**



**FIG. 8**

